From: PETERSON Jenn L
To: Eric Blischke/R10/USEPA/US@EPA
Subject: RE: Dioxin TRV - Fish
Date: 09/16/2008 03:00 PM

Eric,

I will go ahead and do my own evaluation - I have been wanting to pull down the new Round 3 fish info corrected for whole body. I did my original analysis on the "whole body without fillet". However, I am attaching an e-mail (see below) from Burt where he is indicating the same problem I identified with the dioxin screening number.

-Jennifer

-----Original Message-----
From: Shephard.Burt@epamail.epa.gov
[mailto:Shephard.Burt@epamail.epa.gov]
Sent: Tuesday, July 22, 2008 5:57 PM
To: Robert W. Gensemer
Cc: Carrie A. Smith; David DeForest; PETERSON Jenn L;
Goulet.Joe@epamail.epa.gov
Subject: RE: Dioxin TRV Question

Hey kids,

My 2 cents on the dioxin question is as follows. When was the 90 pg/g value for 2,3,7,8-TCDD approved by EPA? The 2,3,7,8-TCDD tissue TRV for fish from both the TRV memos and Appendix B of the September 9, 2005 PRE give a fish tissue LOEC TRV of 1.95 pg/g, but used the 90 pg/g TRV based on LWG's derivation of a 5th percentile of the 2,3,7,8-TCDD fish effects residues. The 1.95 pg/g number comes from a paper by John Giesy and coworkers in 2002, and is an estimated whole body residue derived from a measured mean TCDD concentration of 0.76 pg/g in rainbow trout eggs from which fry had reduced survival. LWG used a conversion factor to translate from the measured egg residue to an estimated whole body residue in adult fish. The Giesy study gives the lowest LOER of any dioxin study I'm aware of for any aquatic species, its also lower than any NOER for any aquatic species. The Giesy paper itself has some issues. The LOER as given in the text (0.3 pg/g) differs from that in the tables of the paper, there was also some elevated control mortality and a weak dose-response relationship.

There are a bunch of fish LOERs for survival of sac fry starting at around 40-90 pg/g for both lake trout and rainbow trout. There's also one of the few population growth rate studies for any chemical and species with dioxin effects on mummichog population growth rate, with effects at about 60 pg/g. I suspect LWG's 90 pg/g 5th percentile is actually high by a factor of about 2x.

Also, for what its worth, the tissue screening concentration (BCF x chronic AWQC) for 2,3,7,8-TCDD is 50 pg/g. That value was published in my Shephard 1998 paper, but not in the Dyer et al. 2000 paper. Still would result in all of the data up through the end of Round 2 screening out before it gets into the BERA. I've never done a dioxin 5th percentile from empirical data, but it would be doable, as there is a substantial amount of residue-effects data for 2,3,7,8-TCDD.

The comments on the PRE we sent LWG in April 2006 had the following on TCDD:

> * 2, 3, 7, 8-TCDD: The PRE TRV of 90 pg/g is 46 times greater than the TRV LOEC of 1.95 pg/g (Table 4). This occurs because the lowest LOEC of 1.95 pg/g is much lower than the other 2,3,7,8-TCDD LOECs and the availability of 34 fish whole body LOECs (per Table 1-1, Attachment 1, Appendix B of the PRE) results in a 5th percentile that is greater than the lowest LOEC. Although from a strictly numeric perspective the PRE TRV is less conservative than the LOEC TRV, whether the PRE TRV is sufficiently conservative for the PRE is a risk management decision. Many of the whole body NOEC and LOEC values for 2,3,7,8-TCDD tabulated in the TRV TM, including the lowest LOEC of 1.95 pg/g, were actually estimated from 2,3,7,8-TCDD concentrations measured in fish eggs. However, the lowest measured whole body NOEC and LOEC values were 46 and 85 pg/g, respectively, for lake trout. Accordingly, it could be argued that the PRE TRV of 90 pg/g is under-conservative for a screen, although it does appear that the PRE TRV is consistent with the approach outlined by EPA.

Best regards,

Burt Shephard
Risk Evaluation Unit
Office of Environmental Assessment (OEA-095)
U.S. Environmental Protection Agency, Region 10
1200 6th Avenue
Seattle, WA 98101

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"If your experiment needs statistics to analyze the results, then you ought to have done a better experiment"
- Ernest Rutherford

-----Original Message-----
From: Blischke.Eric@epamail.epa.gov
[mailto:Blischke.Eric@epamail.epa.gov]
Sent: Tuesday, September 16, 2008 2:27 PM
To: PETERSON Jenn L
Subject: RE: Dioxin TRV - Fish

Jennifer, go ahead and look at the data independently. However, I have looked at both the Round 3, Round 2 and Round 3 data in my evaluation. I see no 2,3,7,8-TCDD or TEF based results that approach the 90 pg/g screening level TRV. I really do not want to develop a TRV based on speculation. Show me a sample (except for the RPAC outfall lumbriculus sample) that exceeds the screening criteria and we will consider it. I really do not know what to say about the screening number. I think that both Bob and Burt are comfortable with this value.

Eric

"PETERSON Jenn L" <PETERSON.Jenn@deq.state.or.us>	Eric Blischke/R10/USEPA/US@EPA	To
09/16/2008 11:25 AM	RE: Dioxin TRV - Fish	cc Subject

I don't want to belabor this, but I think we have to calculate TEQ's based on Round 3 data for fish. My initial look at this a while back showed these samples significantly higher (e.g. bass PCB 126 highest was over 300 pg/g alone). However, I wish you would re-visit your dioxin like "screening number" because that is where the problem lies. There is literature out there already that could help address this (e.g. see attached SSD by Steevens et al.).

-Jennifer

-----Original Message-----
From: Blischke.Eric@epamail.epa.gov
[mailto:Blischke.Eric@epamail.epa.gov]
Sent: Tuesday, September 16, 2008 11:05 AM
To: PETERSON Jenn L
Subject: RE: Dioxin TRV - Fish

The TEFs for the mono-ortho PCBs are all reports as <0.000005 (that's five zeros). Not significant.

Of the non-ortho PCBs, PCB 126 has a fish TEF of 0.005. I just looked at the PCB 126 levels. Here are the highest:

Scuplin - RM 2 - 177pg/g
Lumbric - RM 2 - 249 pg/g
SMB - RM 3 - 103 pg/g
Carp - RM 3-6 - 112 pg/g
SMB - Swan Island Lagoon - 109 pg/g

Of the samples that had high dioxin detections:

Sculpin - RM 7 - 64 pg/g
SMB RM 7 - 49 pg/g
Lumbri - RPAC outfall - 118 pg/g.

These concentrations will not contriute significantly to the TECs I already calculated and sent to you yesterday.

I really see no need to develop a TRV for dioxin based on the results of my analysis.

Eric

"PETERSON Jenn L" <PETERSON.Jenn@deq.state.or.us>	Eric Blischke/R10/USEPA/US@EPA	To
09/16/2008 10:43 AM	RE: Dioxin TRV - Fish	cc Subject

In general this is true for fish (the opposite is true for birds and both are important for mammals), but we have some high PCB detections.

Here is the list:

Non-ortho PCBs
3,3',4,4'-TCB (77)
3,4,4',5-TCB (81)
3,3',4,4',5-PeCB (126)
3,3'4,4',5,5'-HxCB (169)
Mono-ortho PCBs
3,3',4,4'-PeCB (105)
2,3,4,4',5-PeCB (114)
2,3',4,4',5-PeCB (118)
2',3,4,4',5-PeCB (123)
2,3,3',4,4',5-HxCB (156)
2,3,3',4,4',5'-HxCB (157)
2,3',4,4',5,5'-HxCB (167)
2,3,3',4,4',5,5'-HeCB (189)

-----Original Message-----
From: Blischke.Eric@epamail.epa.gov [mailto:Blischke.Eric@epamail.epa.gov]
Sent: Tuesday, September 16, 2008 10:36 AM
To: PETERSON Jenn L
Subject: RE: Dioxin TRV - Fish

Are these the non-ortho and mono-ortho PCBs? If so, I do not think they will contribute appreciably to dioxin risk given the low TEFs.

Eric

"PETERSON Jenn L" <PETERSON.Jenn@deq.state.or.us> — To: Eric Blischke/R10/USEPA/US@EPA — cc: — 09/16/2008 10:33 AM — Subject: RE: Dioxin TRV - Fish

O.k. The are listed in that document I sent you - I could also send you my spreadsheet I put together to do the Rhone P. risk assessment if you are curious.

-Jennifer

-----Original Message-----
From: Blischke.Eric@epamail.epa.gov [mailto:Blischke.Eric@epamail.epa.gov]
Sent: Tuesday, September 16, 2008 10:31 AM
To: PETERSON Jenn L
Subject: RE: Dioxin TRV - Fish

I did not include them. I really don't know which ones they are nor do I know the TEF to apply.

Eric

"PETERSON Jenn L" <PETERSON.Jenn@deq.state.or.us> — To: Eric Blischke/R10/USEPA/US@EPA — cc: — 09/16/2008 09:18 AM — Subject: RE: Dioxin TRV - Fish

Eric,

I don't see the PCB dioxin like congeners in your spreadsheets. Am I

missing them?

-Jennifer

-----Original Message-----
From: Blischke.Eric@epamail.epa.gov
[mailto:Blischke.Eric@epamail.epa.gov]
Sent: Monday, September 15, 2008 1:05 PM
To: PETERSON Jenn L
Cc: rgensemer@parametrix.com; Shephard.Burt@epamail.epa.gov
Subject: RE: Dioxin TRV - Fish

Jennifer, I have calculated a TEC for the smallmouth bass sample with the highest 2,3,7,8-TCDD concentration. I have added the TEFs per the document you just provided. I wasn't sure how to handle the non-2,3,7,8 substituted congeners (e.g., tetrachlorodibenzofuan) and so just applied a TEF of zero. If you have a better number, please add it in.

You can see from the spreadsheet that the calculated TEC for the dioxin compounds is 8.2 pg/g. Unless I made a significant error here, this strongly suggests that we do not need a TRV for dioxin in fish tissue.,

Eric

(See attached file: RM7SMBDioxinTEC.xls)

"PETERSON Jenn L" <PETERSON.Jenn@deq.state.or.us> 09/15/2008 11:41 AM

To: Eric Blischke/R10/USEPA/US@EPA
cc:
Subject: RE: Dioxin TRV - Fish

For an exposure point concentration, you sum dioxins and furans and dioxin like PCB congeners according to the attached document. Each congener is assigned a TEF that equates its toxicity to 2,3,7,8-TCDD. You then compare that exposure point concentration to the TRV for 2,3,7,8-TCDD. I think Query manager can do it if the Round 3 data is available. There were problems outlined earlier with the fish 2,3,7,8-TCDD TRV used in the Round 2 Report, which is why I would like one developed using SSD methodology.

-Jennifer

-----Original Message-----
From: Blischke.Eric@epamail.epa.gov
[mailto:Blischke.Eric@epamail.epa.gov]
Sent: Monday, September 15, 2008 11:21 AM
To: PETERSON Jenn L
Cc: ANDERSON Jim M; Shephard.Burt@epamail.epa.gov; Jeremy_Buck@fws.gov; rgensemer@parametrix.com; Robert Neely
Subject: RE: Dioxin TRV - Fish

We have been through this before. How do you do that?

Eric

"PETERSON Jenn L" <PETERSON.Jenn@deq.state.or.us> 09/15/2008 10:40 AM

To: Eric Blischke/R10/USEPA/US@EPA
cc: "ANDERSON Jim M" <ANDERSON.Jim@deq.state.or.us>, Burt Shephard/R10/USEPA/US@EPA, <Jeremy_Buck@fws.gov>, "Robert Neely" <Robert.Neely@noaa.gov>, <rgensemer@parametrix.com>
Subject: RE: Dioxin TRV - Fish

You have to calculate a dioxin TEQ for fish. The TCDD screen does not answer the question.

-Jennifer

-----Original Message-----
From: Blischke.Eric@epamail.epa.gov
[mailto:Blischke.Eric@epamail.epa.gov]
Sent: Monday, September 15, 2008 10:11 AM
To: PETERSON Jenn L
Cc: ANDERSON Jim M; Shephard.Burt@epamail.epa.gov; Jeremy_Buck@fws.gov;
Robert Neely; rgensemer@parametrix.com
Subject: Re: Dioxin TRV - Fish

Jennifer, we went with the 90 pg/g screening criteria for 2,3,7,8-TCDD. We did not look at other dioxin congeners. Based on this screening step, only one sample - a lumbriculus sample collected offshore of the RPAC outfall - exceeds this criteria. As a result, we did not develop TRVs for dioxin.

I just performed a 2,3,7,8-TCDD screen for all tissue data (including Round 3B) collected at Portland Harbor. The highest 2,3,7,8-TCDD fish tissue concentration was a Round 1 smallmouth bass sample collected in the vicinity of RM 7 at 1.49 pg/g (ng/kg).

Burt and Bob, is my recollection accurate?

Eric

"PETERSON Jenn L" <PETERSON.Jenn@deq.state.or.us> 09/15/2008 08:59 AM

To: Eric Blischke/R10/USEPA/US@EPA, Burt Shephard/R10/USEPA/US@EPA
cc: "ANDERSON Jim M" <ANDERSON.Jim@deq.state.or.us>, "Robert Neely" <Robert.Neely@noaa.gov>, <Jeremy_Buck@fws.gov>
Subject: Dioxin TRV - Fish

What was the decision on the development of a dioxin TRV for fish? Was the Round 3 Data screened for dioxin TEQ?

-Jennifer

[attachment "DioxinTEQ_Methods_EPAJune2008.pdf" deleted by Eric Blischke/R10/USEPA/US]

(See attached file: Steevens 2005 IEAM Paper.pdf)